Social influences on birth weight

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Risk factors for low birth weight are strongly influenced by the social environment

Birth weight, like growth, is determined by the complex interplay of genetic and environmental factors. The proportional contribution of these influences is unclear. However, birth weight varies within genetically similar populations,¹⁻³ suggesting that environmental factors play a significant role. Secular changes in birth weight⁴ also suggest an environmental influence. Birth weight also shows a reverse social gradient such that increasing disadvantage is associated with decreasing birth weight.¹⁻³

ENVIRONMENTAL FACTORS AFFECTING BIRTH WEIGHT

Environmental factors with a known association with birth weight are nutrition, smoking, maternal ill health, and genital infection. The association of other factors such as stress⁵ and exposure to some types of work during pregnancy⁶ remains unproven. Other risk factors for low birth weight such as maternal age, although not themselves environmental factors, are strongly influenced by the social environment.

Severe energy restriction during pregnancy, such as occurs in some developing countries⁷ and was noted in the 1945 Dutch Hunger Winter⁸, reduces birth weight but, randomised controlled trials of nutritional interventions in the index pregnancy have failed to show convincing benefit.⁹ Nutrition may exert its effect over a longer period through an effect on maternal growth in childhood¹⁰ and possibly through an intergenerational effect.¹¹ Adult height has a known association with relative nutritional impairment in childhood,¹² and maternal height is an important determinant of birth weight.¹³

The association of smoking with a reduction in birth weight is well established.¹³ Maternal ill health has been associated with reduced birth weight,¹⁴ and genital infection exerts its influence through increasing the risk of preterm delivery.¹⁵

Evidence for an independent effect of stress is slight, but one study does show stress exerting an effect through increased smoking.¹⁶

SOCIAL GRADIENT IN BIRTH WEIGHT

Given the importance of birth weight for infant, childhood, and adult health,¹⁷ a 150–200 g social gradient in mean birth weight and 30% of births less than 2500 g attributable to social inequalities¹ is a key public health issue. Reductions in inequalities in infant mortality and many childhood and adult health inequalities, key government health targets,¹⁸ are unlikely to be achieved without a narrowing of the social gradient in birth weight. Interventions to increase birth weight in disadvantaged groups have been largely unsuccessful,¹⁹ and, although mean birth weight has increased,²⁰ the rate of change is slow and the gradient remains unchanged.

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The failure of interventions to influence the social gradient is likely to result from a focus on modifying individual risk factors such as smoking, diet, and infection in the already established pregnancy with the intervention starting around 16 weeks at the earliest. The social gradient in birth weight probably arises as a result of the accumulation and addition of risk and protective factors over time²¹ and across generations¹¹ rather than resulting from risk exposures within the index pregnancy. Poor socioeconomic circumstances in early life may lead to biological vulnerability in later life,²² and adult health behaviours seem to have socioeconomic roots early in life.²³ A woman

whose parents were disadvantaged is more likely to have been low birth weight herself, to have experienced more childhood ill health, to have had a less nutritious diet with adverse effect on her growth, to have started smoking in adolescence and be less likely to quit in early pregnancy, and to come to pregnancy at an earlier age.

Although innovative approaches to smoking cessation and stress reduction may have some effect in the short term, reduction of the social gradient is likely to be a long term goal requiring attention to the nutritional and health status of young children. Of equal importance will be improving the overall social environment in which children grow up so that protective factors, such as maternal education, become more evenly distributed across social groups and risk factors are reduced in disadvantaged groups.

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